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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,429	07/21/2003	Stephen J. VETTER	000210-206	1428
30640	7590	03/02/2004	EXAMINER	
MARSTELLER & ASSOCIATES, P.C. PO BOX 803302 DALLAS, TX 75380-3302			PATEL, ISHWARBHAI B	
			ART UNIT	PAPER NUMBER

2827

DATE MAILED: 03/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/604,429

Applicant(s)

VETTER ET AL.

Examiner

Ishwar (I. B.) Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 7-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/21/2003</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-6, drawn to a printed circuit board, classified in class 174, subclass 262.
 - II. Claims 7-18, drawn to a method for adapting a printed circuit board, classified in class 29, subclass 852.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions group II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process. Instead of plating the open structure and then removing the plating from the middle portion by drilling a second passageway, the middle portion can be made of a non-palatable material to begin with, avoiding complete plating of the opening structure and also, avoiding drilling of the second passageway. Further, as described in the background section of the disclosure, the product can be made by sequential lamination, as known in the art.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Thomas F. Marsteller (Reg. 29,672) on February 9, 2004, a provisional election was made with traverse to prosecute the invention of group I, a printed circuit board, claims 1-6. Affirmation of this election must be made by applicant in replying to this Office action. Claims 7-18 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

6. The drawings are objected to because:
 - (a) The figures are improperly cross-hatched. All of the parts shown in section, and only those parts, must be cross-hatched. The cross hatching patterns should be

selected from those shown on page 600-114/115 of the MPEP based on the material of the part. See also 37 CFR 1.84(h)(3) and MPEP § 608.02.

(b) The cross section for the middle conductor layer in the middle two holes in figure 3 is not clear.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

7. The disclosure is objected to because of the following informalities:

(a) "Voids 32", paragraph [0032], should be "voids 38".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, line 9-10, "the first bore diameter being ***smaller*** than the first passageway diameter", is confusing.

It is unclear to the examiner as to what is claimed by "the first passage way", if the first bore diameter is smaller than the first passageway diameter.

In the description, the “passageway” is described as the opening connecting the first bore and the second bore, and is described as smaller than the first and second bore. The phrase “passageway”, “first bore” and “second bore”, should be used consistently throughout the application for the same structural element.

Further, line 16-19 “the first through passageway, first bore hole, and second bore hole comprising a desired open structure communicating between the first surface and the opposing second surface, the open structure being plated with a desired conductive material” is confusing.

It is unclear to the examiner as to what is claimed by “open structure communicating between the first surface and the opposing second surface; the open structure being plated with a desired conductive material”, as in the final structure the second passage way formed is at least as large as the first passageway, creating a discontinuity between the first bore and the second bore plating.

Also, line 20-23, “a second through passageway concentric with the first through passageway extending through the open structure formed in the base layer from the first surface to the second surface; the second through passageway having a second passageway diameter at least as large as the first passageway diameter; the second through passageway being formed subsequent to plating of the open structure” is confusing.

It is unclear to the examiner as to the existence of the first passageway in the final structure if the second passage way formed with the diameter at least as large as the first passageway.

Claims 2-6 depend upon claim 1 and inherit the same deficiency.

Further, regarding claim 2, "a first connector pin compatible with at least a first portion" and "a second connector pin compatible with at least a second portion" is vague.

It is unclear to the examiner as to what is claimed by "compatible".

Also, regarding claim 3, "a further comparable metallic layer is electroplated over the electroless metal deposition" is vague.

It is unclear to the examiner as to what is claimed by "comparable"

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

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Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

11. Claims 1 and 3-6, as best understood, in view of the 112 second paragraph rejection above, are rejected under 35 U.S.C. 102(e) as being anticipated by Gately et al., US Patent No. 6,541,712, hereafter, Gately.

Regarding claim 1, Gately discloses a printed circuit board adapted to mount electrical circuitry of the type having at least one base layer formed with first and second opposing surfaces, the invention comprising:

a first through passageway having a first passageway diameter extending through the base layer from the first surface to a desired depth from the first surface between the first and second surfaces (hole 184b, see figure 5A-5C, column 10, line 26-30 and column 11, line 4-10);

a first bore hole having a first bore diameter and concentric with the first through passageway formed between the first surface and a desired first depth in the base layer between the first and second surfaces; the first bore diameter being greater than the first passageway diameter (hole 184a, figure 5A-5C, column 10, line 20-25 and column 11, line 4-22);

a second bore hole having a second bore diameter and concentric with the first through passageway formed between the second surface and a desired second depth in the base layer between the first and second surfaces; the second bore diameter

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being greater than the first passageway diameter (hole 184c, figure 5A-5C, column 10, line 20-25 and column 11, line 4-22).

Regarding claim 3, Gately further discloses the printed circuit board includes multiple layers (multilayer printed circuit board, see figure 5 and 5A-5C, column 10, line 10-20).

Regarding claim 4, Gately further discloses the holes formed in the printed circuit board form cylindrical voids, (drilled holes 180a, 180b and 180c, see figure 5A-5C).

Regarding claim 5, Gately further discloses a layer of electroless metal is deposited onto walls of the open structure; and, a further comparable metallic layer is electroplated over the electroless metal deposition (conventional electroless process to apply a thin layer of copper and an electrolytic process to apply a thicker layer of copper, column 10, line 60-67).

Regarding claim 6, Gately further discloses the metal is copper (conventional electroless process to apply a thin layer of copper and an electrolytic process for to apply a thicker layer of copper, column 10, line 60-67).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 2, as best understood, in view of the 112 second paragraph rejection above, is rejected under 35 U.S.C. 103(a) as being unpatentable over Gately et al., US Patent No. 6,541,712, hereafter, Gately, as applied to claims 1 and 3-5 above.

Regarding claim 2, the applicant is claiming a first connector pin compatible with at least a first portion of the open structure being inserted into the open structure from the first surface; and, a second connector pin compatible with at least a second portion of the open structure being inserted into the open structure from the second surface.

Gately fails to explicitly disclose two connector pins inserted, one each from the first surface and the second surface of the board.

However, Gately discloses, in the embodiment of figure 2, a contact pin 32, inserted from the first surface of the board, column 4, line 55-65, and further discloses that two pins from two different component can be inserted into the upper conductive portion 40a and into the lower conductive portion 40c, increasing the circuit board density, column 5, line 3-8.

A person of ordinary skill in the art at the time the invention was made would readily recognize the advantage of connecting components from both the side of the board to increase the circuit board density.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit board embodiment of Gately with a first connector pin compatible with at least a first portion of the open structure being inserted into the open structure from the first surface; and, a second connector pin compatible with at least a second portion of the open structure being inserted into the open structure from the second surface, as further taught by Gately, in order to increase the component density of the circuit board.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Farquhar et al., discloses a multisegmented plated through holes, see figure 9 and 15.

Keesler et al., discloses noncontinuous via holes, see figure 4B.

Gailus discloses two pins inserted from upper and lower surfaces of the board, see figure 3A.

Frei et al., discloses stepped via holes, see figures 7, 10 and 15.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

IB Patel

I B Patel
Examiner
GAU: 2827
February 15, 2004